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ADVERSE CHILDHOOD EXPERIENCES (ACEs) AND THEIR IMPACT ON SUBSTANCE MISUSE & OVERALL HEALTH

SUMMARY

- Adverse Childhood Experiences (ACEs) include emotional, physical, or sexual abuse; witnessing maternal domestic violence; or living with a household member who has a substance use disorder, is mentally ill or suicidal, or is currently or was ever incarcerated during the first 18 years of a child's life.
- Most recent estimates suggest that 43.6% of the youth population in the U.S. and 47.3% of Hoosier youth have experienced at least one ACE in their life.
- ACEs can affect a person's general health status, because they are linked to risk behaviors associated with many leading causes of death, such as sexually transmitted diseases, substance use, depression, suicide, and healthcare utilization.
- The causal relationship between ACEs and future health problems is supported by numerous scientific studies.
- ACES warrant attention and intervention from policymakers, social workers, and healthcare because of the diverse social, health, and economic impacts.
- Policy recommendations include: (1) consistent statewide data collection on ACEs and (2) regular ACE screenings during pediatric visits.

Introduction

Adverse childhood experiences (ACEs) encompass a wide variety of distressing events during a child's life. Originally, ACEs included emotional, physical, or sexual abuse; witnessing maternal domestic violence; and living with a household member who has a substance use disorder or mental illness, is suicidal, or who is currently or was ever incarcerated [1]. In addition, more recent concepts of ACEs include living with a household member who smokes [2], witnessing any inter-partner violence in the household, having parents who are separated or divorced [3], withstanding physical or emotional neglect [4,5], experiencing parent or guardian death [6,7], witnessing neighborhood violence [6,7], enduring socioeconomic hardship [6,7], or experiencing racial discrimination [6,7].

Background on ACEs Research

ACEs came to prominence in 1995, when Kaiser Permanente surveyed adult Health Maintenance Organization (HMO) members in southern California [8]. The study, commissioned by the Centers for Disease Control & Prevention (CDC), included over 9,500 adults and assessed adverse experiences they encountered during childhood and their subsequent and current health status and risk behaviors [1].

While the Kaiser study published numerous findings based on the California HMO population [1,4,9–19], additional studies surveyed other populations, such as urban minority youth [20], high school seniors [21], general adult populations [22,23,24], and adult female twins [25]. Most studies were retrospective in design; however, some prospective studies have

also been conducted [16,18,21]. Many of the studies found a graded relationship between ACEs and health outcomes; i.e., as the number of ACE category exposures increased, so did the risk of a specific health outcome.

National ACE Estimates

The prevalence of ACEs can either be established retrospectively, by surveying adults, or currently by assessing the experiences (and situations) of children. The Kaiser Permanente survey estimated that 52.1% of adults reported at least one ACE exposure [1]. Overlap between ACE categories was common [2]; i.e., those reporting an exposure in one category had a 65 to 93% chance of having an exposure in another category [1].

Starting in 2009, the Behavioral Risk Factor Surveillance System (BRFSS) included an ACE module, which was administered initially only in five states [3]. Based on 2009 BRFSS findings, 59.4% of adults in these five states reported at least one ACE exposure, including:

- Parents separated or divorced (26.6%)
- Verbal abuse (25.9%)
- Substance abuse by a household member (19.1%)
- Having an incarcerated family member (7.2%)

Differences existed by race, age, gender, and educational status, but location (state) generally did not matter [24]. Subsequent BRFSS surveys also estimated the adult prevalence of ACE exposure at 59.4% [29]. While none of these sources are nationally representative, collectively these estimates suggest consistency both over time and across study populations in the prevalence of ACEs. Indiana currently does not participate in the optional ACE module.

For child and youth populations, the National Survey of Children's Health (NSCH) provides national estimates of ACE exposures by interviewing parents. NSCH defines ACEs as socioeconomic hardship, divorce/parental separation, lived with someone who had alcohol or drug problem, victim or witness of neighborhood violence, lived with someone who was mentally ill or suicidal, domestic violence witness, parent served time in jail, treated or judged unfairly due to race/ethnicity, or parental death [6,7]. In both waves of the survey (2011-2012 and 2016), nearly half of all children experienced at least one ACE [6,7]. For more details, see Table 1.

These national estimates appear to be slightly lower than those from the Kaiser population and other subnational estimates. Differences may be because of differing definitions of ACEs or changes over time; additionally, the NSCH estimates are obtained from current parents of these children and may therefore underestimate the true prevalence.

Indiana Estimates

The NSCH provides state-level estimates for 2011-2012 [6] and 2016 [7]. According to the 2011-2012 results, an estimated 52.3% of Hoosier children have experienced at least one ACE, compared to 47.9% of the U.S. population [6]. Twenty-seven percent of Hoosiers ages 0 to 17 have experienced at least two ACEs compared to 22.6% of the U.S. child population [6]. In 2016, 47.3% of Hoosier youth had experienced at least one ACE with 24.2% having experienced two or more [7]. From this estimate, Indiana ranked

Table 1. The Percentage of Children Ages 0-17 with Adverse Childhood Experiences (ACEs), Indiana and United States (National Survey of Children's Health)

	2011-2012		2016	
	Indiana	U.S.	Indiana	U.S.
Any ACE (Total)	52.3%	47.9%	47.3%	46.3%
1 ACE	25.3%	25.3%	23.1%	24.6%
2 or more ACEs	27.0%	22.6%	24.2%	21.7%

28th in the country for any ACE exposure and 32nd for two or more [7]. Indiana's prevalence rate for having either "any ACE exposure" or "at least two ACE exposures" was greater than the national rate [6,7]. For details, see Table 1.

Lastly, the Indiana Youth Survey (INYS) does not ask specifically about ACEs, but it does ask about parental/guardian incarceration and some home life questions, such as arguments within the family, family insults, or yelling [30]. The 2016 estimates for parental incarceration range from 19.0% (12th grade students) to 24.4% (8th grade students) [30]. Based on a cut-off score for what is considered high risk for problem behavior including substance use determined in another study [31], approximately 42% of 12th grade students in the state are at high risk based on family conflict, 25.5% for poor family management, and 31.5% for parental attitudes favorable towards drug use [30].

ACEs and Substance Use

Substance use is perhaps the most widely studied outcome of ACEs. ACEs are linked to alcohol use and alcoholism, tobacco use, as well as illicit drug use or misuse of prescription drugs [1,12,14,17,19, 20, 21].

ACEs are associated with ever using alcohol [13], early initiation of alcohol use [13], heavy drinking [17], self-reported alcoholism [1,12,14,17,19], and marrying an alcoholic [17].

Being a current smoker [1,14] and reporting frequent tobacco use [20] was associated with having had two or more ACE category exposures.

Studies have found positive, graded relationships between ACEs and lifetime drug use, lifetime injection drug use, early initiation of drug use, and drug addiction [1,11,14].

It is estimated that 56 percent of the lifetime drug use prevalence can be attributed to ACEs, as can 63 percent of the lifetime prevalence for illicit drug addictions [11]. Specifically, child sexual abuse was found to increase the odds of developing drug dependence during adulthood by 2.6 times that of adults who did not experience sexual abuse during childhood [25].

Other Health Impacts of ACEs

ACEs have been linked to self-rated general health status. Adults who experienced one or more ACE categories during childhood were more likely to rate their own health as fair or poor compared to those with no ACE exposures. The effect increased as the number of ACEs increased [1,20].

There is some evidence of earlier mortality among those with ACEs [18]. This relationship may be mediated by physical and social health factors [1]. This provides support of a causal model where ACEs may be followed by substance use and physical, mental, social, and reproductive health problems, which may then lead to premature death. Individuals with six or more ACE category exposures died on average 18.5 years earlier than those with no ACE exposure [18].

Some studies suggest a relationship between ACEs and the number of drug prescriptions, especially for psychotropic medications. Adults who had experienced ACEs during childhood were more likely to have a higher number of drug prescriptions as well as having prescriptions in multiple drug classes [16]; and to use psychotropic medications, including antidepressants, anxiolytics, and antipsychotics during adulthood, even when controlling for a history of mental illness in the home [15].

ACEs are also associated, often in a graded fashion, with mental health as the increase in psychotropic medications described earlier suggests. Mental health symptoms associated with ACEs range from antisocial behavior [21], depressive symptoms [1,12,14,15,19–21,25], mood and anxiety disorders [14,15,20,23], increased levels of perceived stress [14], and disrupted sleep [14] to suicidal thoughts and attempts [1,9,12,23,27].

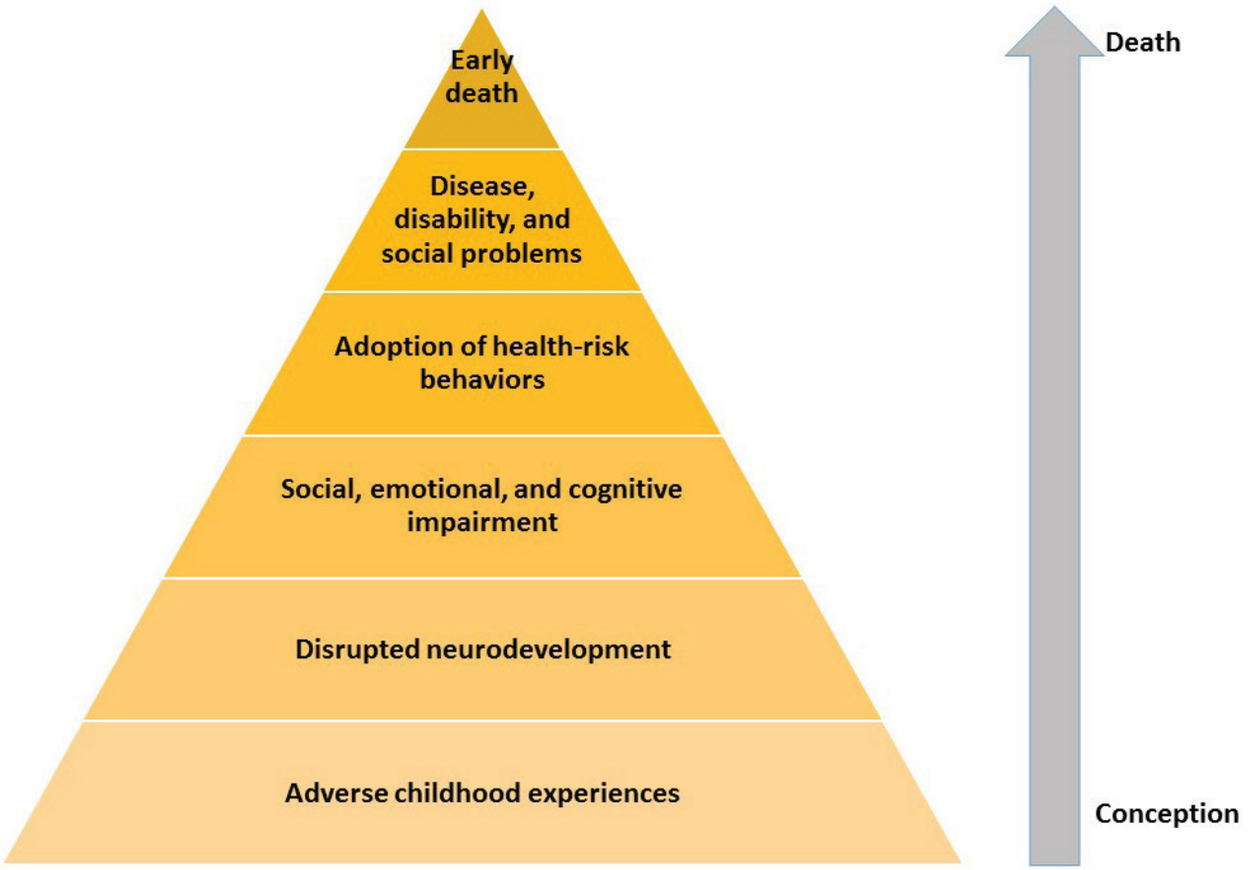
Suicide attempts constitute a commonly reported behavior associated with ACE exposure. Many studies have identified not only increased risk of a suicide attempt with exposure to an ACE, but a graded relationship as well [1,9,23]. In addition, a literature review conducted in 2008 found that sexual abuse was a greater risk factor for suicidal behavior than physical abuse [27].

Furthermore, several risk behaviors have also been linked to ACEs. According to one study, those who experienced ACEs were 40 percent more likely to have anger control issues and 80 percent more likely to engage in inter-partner violence [14]. Sexual risk behaviors and consequences, including promiscuity [1,12,14], sexually transmitted diseases (STDs) [1,12], increased sexual dissatisfaction [5,14], early intercourse [5,14], and both teen and unintended pregnancy [5] were also associated with ACEs.

ACEs and Causality

As many of these studies have suggested, there may be several moderating, mediating, or confounding effects in the causal pathway between ACEs and future health outcomes. In addition, different categories of ACEs often occur together (e.g., physical and sexual abuse) and exposure may be more frequent in populations that are more vulnerable to other life stressors [5]. Furthermore, ACEs occur years before many of the problematic health outcomes may manifest. This complicated pathway makes it difficult to infer causality between an ACE and future health or social problems or early death.

Figure 1: ACE Pyramid – Mechanism by which Adverse Childhood Experiences Influence Health and Wellbeing throughout the Lifespan



Source: Centers for Disease Control and Prevention, 2016 [8]

After nearly two decades of work and many studies including neurobiological, twin, and other epidemiological observational studies, researchers have made a strong case for causality between ACEs and a variety of health outcomes [14]. In addition, the ACE pyramid illustrates the mechanism by which ACE exposure may relate to future health outcomes (Figure 1). In this model, the ACE is followed subsequently by disrupted neurodevelopment, social, emotional, and cognitive impairment, adoption of health-risk behaviors, disease, disability, and social problems, and finally, early death [1].

Policy Recommendations

The potentially significant and lifelong impacts of ACEs on future substance use, mental health, physical health, and mortality call for added attention to preventing and addressing such experiences. The direct impacts on individual health, healthcare utilization, and early mortality have potentially widespread economic, social, and individual impacts. As such, there is a need to continue to monitor and address ACEs. Below are potential policy considerations.

Increase Data Collection in Indiana

As of 2014, BRFSS has collected at least one year of data on ACEs in 32 states [3]. Indiana has not participated in the voluntary module, but doing so may improve awareness and understanding of the prevalence of ACEs in the state. As suggested by the National Survey of Children's Health, Indiana ranks 38th in terms of ACEs as acknowledged by parents of current children [34]. This helps support the notion of ACEs as being frequent and potentially problematic in the state.

While BRFSS and the National Survey of Children's Health are good starting points, they either are retrospective accounts of ACE prevalence or parental descriptions of current children exposures. The Indiana Youth Survey may provide a better representation of ACE prevalence as it is directly administered to current youth; however, it too has limitations in this arena [30]. The Indiana Youth Survey has a few questions that may shed light on ACEs indirectly, but intentional questions about ACEs would provide a more complete estimate.

Screening for ACEs in the Medical Setting

The many implications of ACE exposure as well as the proposed importance of early identification [4] suggest a need for regular screening for ACEs. During pediatric visits, patients are screened for a variety of family and environmental factors which may be risk factors that have implications for the child's health. The American Academy of Pediatrics (AAP) already endorses evaluating familial and household conditions during well-child visits for children [35]. Currently screenings for postpartum mood and anxiety disorders,

poverty, parental mental health, and substance use are supported [35]. Additional questions for patients about their exposure to ACEs, ideally directly administered to patients who are old enough, may help primary care providers better address health needs and potential unsafe living conditions for children.

While the AAP is supportive of such efforts, a 2013 survey of pediatricians found that only 4% of pediatricians regularly ask about the seven ACEs considered and 32% don't ask about any [36]. Additionally, nearly 90% of pediatricians were generally unfamiliar with the ACE study [36]. Recent healthcare reform efforts for providers and delivery organizations to focus more on social determinants of health may support physicians and providers in supporting both pediatric and adolescent patients who have experienced ACEs.

After the extensive research regarding the prevalence, mental health, physical health, and healthcare utilization associated with ACEs, Kaiser Permanente has changed their practice to screen for and address ACEs [37]. Because of their high investment in this shift, understanding their procedure, challenges, and successes with implementing this change may be useful in other contexts. Kaiser has included screening for ACEs in their Past History questionnaire, asking questions such as "Have you been physically abused as a child?" and "Who in your family has been alcoholic or a drug user?" After a positive screen for any of the ACE-related questions, providers have suggested structured responses such as "I see that you have ____, tell me how that has affected you later in your life." An independent neural network analysis found significant reductions in doctor office visits, emergency department visits, and hospitalizations. While the exact mechanism for this change is unknown, researchers involved with the ACE study suggest that integrating this information into current and future visits and patients trusting the providers with this information may be important for reducing doctor office visits [37].

Researchers involved with the Kaiser study acknowledge that while there are potentially significant benefits to integrating such a practice into usual preventive and primary care, doing so is not without challenges [37]. Their implementation required provider training and a shift in provider mentality as it is generally easier to address current, acute health concerns rather than these somewhat distal health histories. They also suggest that there may be cost and time savings in the long-run, but likely not in the short-term [37]. The practice changes implemented through Kaiser may be transferable, but without the support and investment in such a practice, implementing in other settings may be more challenging, especially without provider buy-in and staff dedicated to making this change.

Conclusions

ACE exposures can have implications for future mental health, substance use, physical health, morbidity, mortality, and healthcare utilization and spending in those afflicted. Additionally, nearly half of the current Indiana youth population has experienced at least one ACE in their lifetime. The high prevalence and diverse health, social, and economic concerns associated with ACEs as well as the strong case for causality suggest a need to better estimate, identify, and address ACEs.

Such practices have been shown to be feasible in a medical setting and may provide potential time and cost savings, but are not yet widely implemented. Policymakers, researchers, public health practitioners, and healthcare providers may all have interest in working collaboratively to address ACEs in our local community.

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